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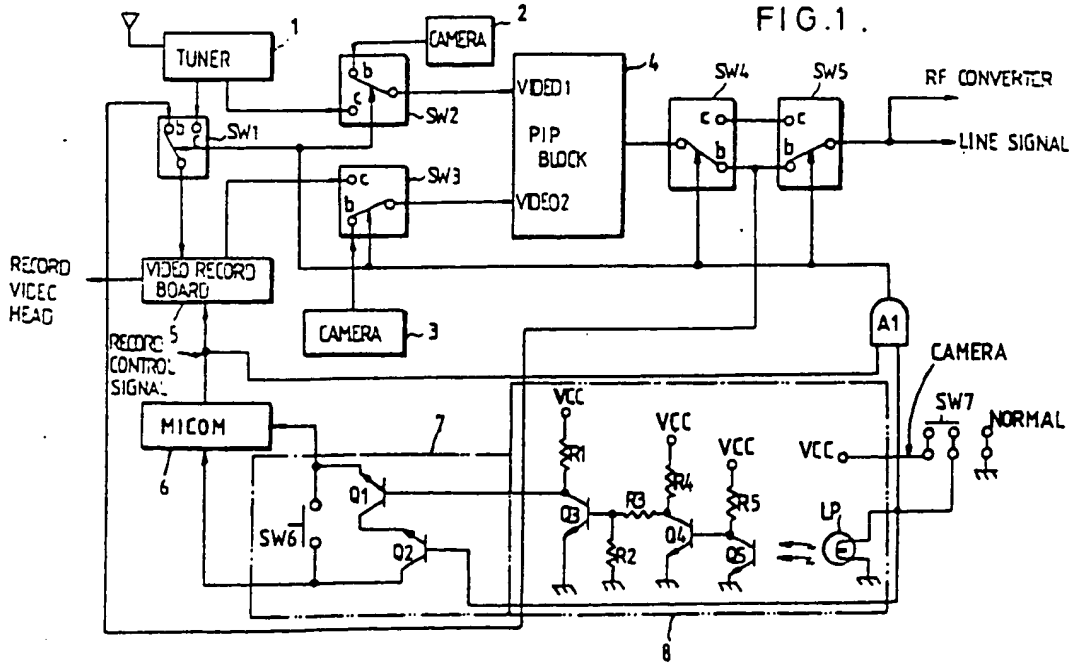
(54) Television surveillance system

(57) The system comprises a monitoring circuit for a VTR and includes an image-record selector 8 which triggers image-recordal in response to an intruder operating a sensor LP, Q5, and a picture-in-picture unit 4 which processes image signals from at least one video camera 2, 3 so as to prepare the video camera signals for recordal. Preferably, the circuit further comprises a switching control unit 7, a plurality of switching circuits SW1-SW5, and a video recording control unit (5). The switching circuits SW1-SW5 are connected to various inputs and outputs of the picture-in-picture unit 4.

FIG.1.



GB 2 226 732 A

FIG.1.

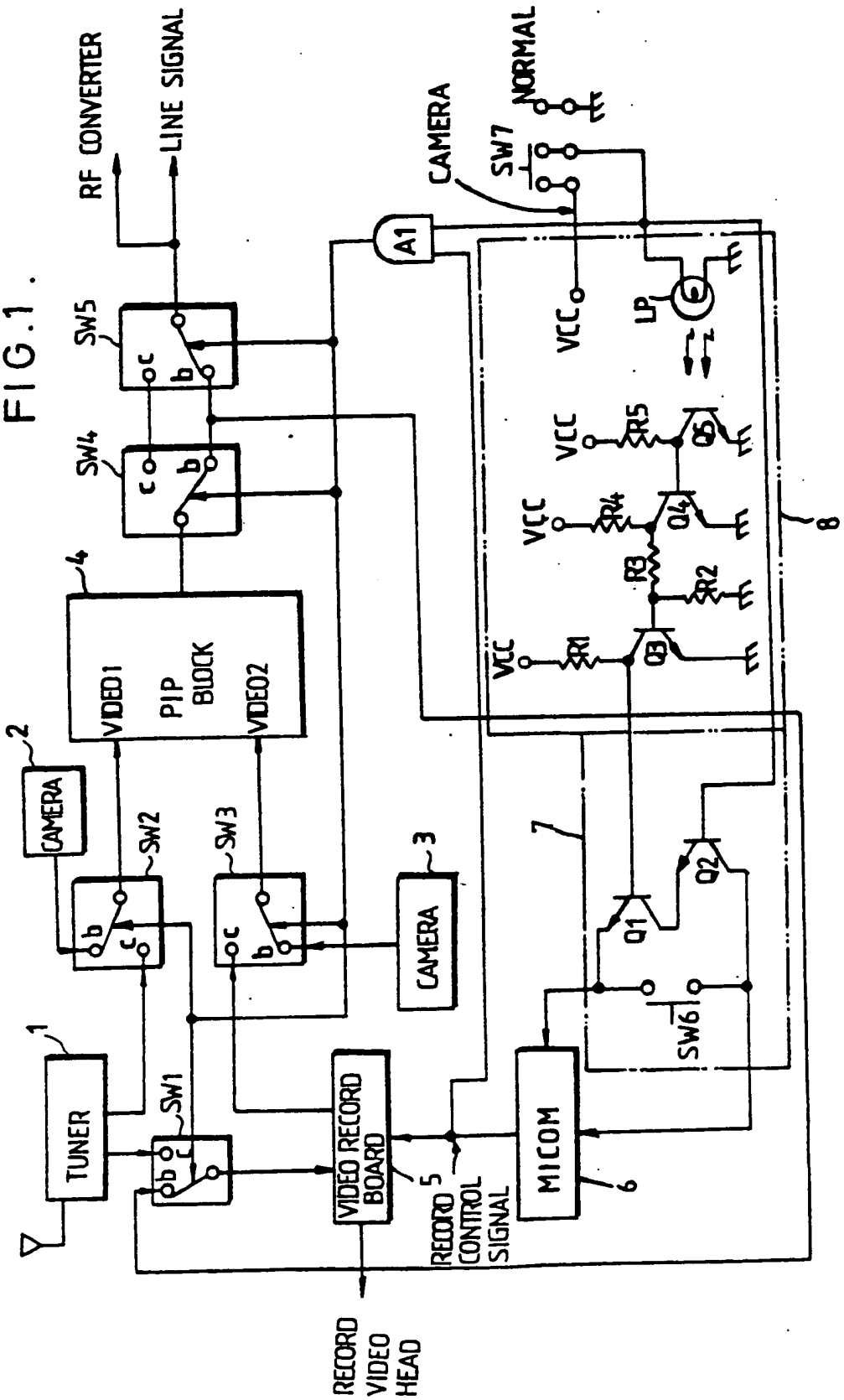

RF CONVERTER
LINE SIGNAL
CAMERA
SW7
NORMAL
A1
SW5
SW4
VCC
LP
R5
Q5
R4
Q4
R3
R2
R1
Q3
8
4
VIDEO1
PIP
BLOCK
VIDEO2
2
CAMERA
SW2
SW3
3
CAMERA
7
Q1
Q2
SW6
1
TUNER
SW1
VIDEO RECORD
BOARD
5
RECORD
CONTROL
SIGNAL
MICOM
6
RECORD
VIDEO
HEAD

FIG.2.

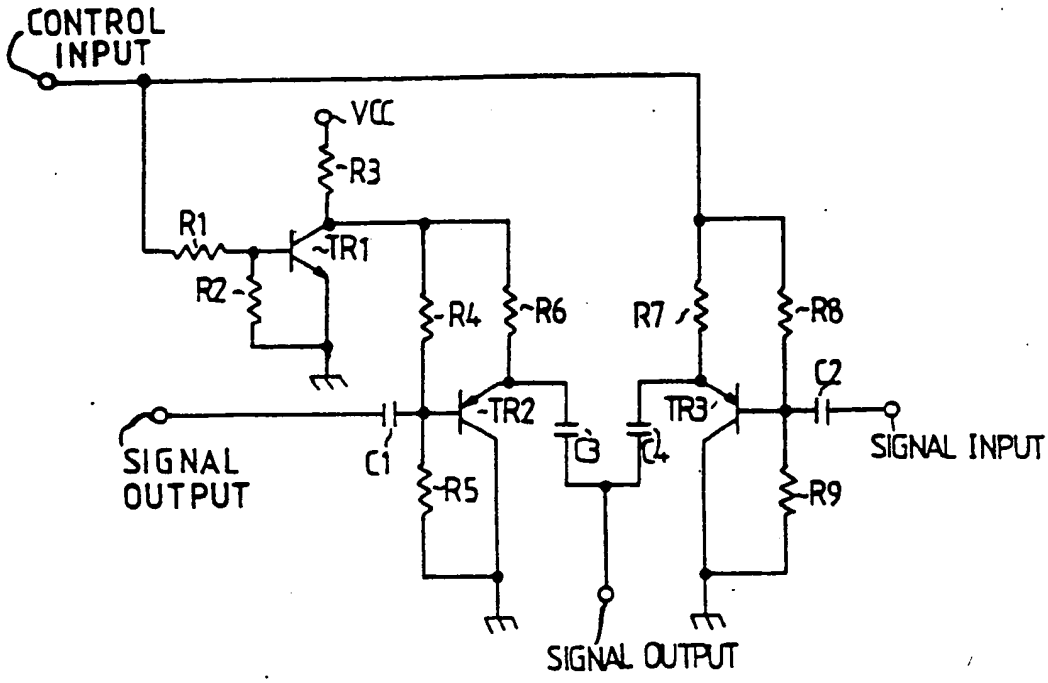
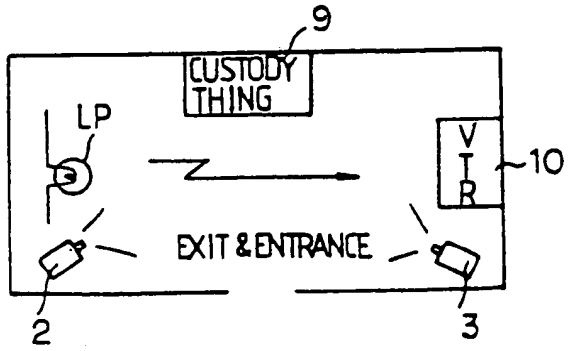

CONTROL INPUT
VCC
R3
R1
TR1
R2
R4
R6
R7
R8
C2
TR2
TR3
SIGNAL OUTPUT
C1
C3
C4
SIGNAL INPUT
R5
R9
SIGNAL OUTPUT

FIG.3.


9
CUSTODY THING
LP
V T R
10
EXIT & ENTRANCE
2
3

M&C FOLIO: 230P59119 WANGDOC: 1344s

A MONITORING CIRCUIT FOR A VTR

The present invention relates to a monitoring circuit for a VTR, particularly to a circuit which can monitor a specified area using a VTR and video camera.

In the conventional VTR, a PiP (picture-in-picture) operation is performed simply by using a received image signal and an image signal applied from another VTR. Thus, two screens can be recorded and reproduced at the same time, using the PiP screen - which consists of a main screen and a dependent screen.

The present invention seeks to provide a monitoring circuit which can be used to monitor a specified area and record images of any intruder. The arrangement can thus be used for the surveillance of valuables.

According to the present invention there is provided a monitoring circuit for a VTR comprising: an image-record selector which triggers image recordal in accordance with the operation of a sensor, and a picture-in-picture unit which processes image signals from at least one video camera so as to prepare the signals for recordal.

An embodiment of the present invention will now be described, by way of example only and with reference to the accompanying drawings, in which :-

Figure 1 is a circuit diagram of an embodiment of the present invention,

Figure 2 is a detailed circuit diagram of the present invention, and

Figure 3 is an equipment static diagram of the camera and VTR as used in the embodiment of the present invention.

The embodiment of the invention will first be described with reference to figures 1 and 3. A broadcasting signal selected by tunner 1 is applied, as the video signal 1, to a PiP block 4 via a switching circuit SW2. Video signal 1 is also applied to an image-record board 5. The image-record board 5 provides a signal, as video signal 2, to PiP block 4 via switching circuit SW3. Board 5 also provides for recordal of the signal, using the video head, in accordance with a record control signal from MICOM 6.

A PiP video signal is genrated by PiP block 4 and is applied to an RF converter and to the output stage of

the line signal, via switching circuits SW4 and SW5. The output of PiP block 4 is also applied to the image-record board 5, via switching circuits SW4 and SW1.

Switching circuits SW1-SW5 are controlled by the output level of an AND gate A1. Switching circuits SW2 and SW3 select an image signal from camera 2 or camera 3, as shown in Figure 1.

With reference to figure 2, input signals applied to the bases of transistors TR2 and TR3 are selectively provided through the emitters of those transistors. One of the transistors TR2 and TR3 is selected by operation of transistor TR1 in accordance with a control input.

The output of AND gate A1 is applied as the control input to switching circuits SW1-SW5. The record-control signal from MICOM 6 and the signal selected by the selecting switch SW7 (which selects between the camera and the normal VTR signal), are applied to respective input terminals of AND gate A1.

An image-record selector 8 is constructed so that operation of lamp LP is controlled by selecting switch SW7, whereby transistors Q1-Q4 are controlled by output from a phototransistor Q5. That is, when light from lamp LP illuminates the base of phototransistor Q5,

phototransistor Q5 is turned on. When the illumination is removed the phototransistor is turned off. If the lamp LP and the VTR 10 (including phototransistor Q5) are installed as shown in Figure 3, the light of the lamp LP is blocked from the base of the phototransistor Q5 when an intruder comes near an article which is in custody or under surveillance. Thus, the apparatus can be arranged such that the PiP block 4 begins to record when illumination of the article is interrupted.

Switching unit 7 comprises transistors Q1 and Q3 and these are driven by the output from the image-record selector 8. Selector 8 is under the control of selecting switch SW7, which switch is connected in parallel with recording switch SW6 contained in unit 7. Switch SW6 is operable to interconnect the emitter of Q1 and the collector of Q2.

Operation of the switching circuit shown in Figure 2 will now be described.

Separate input signals are respectively applied to the base of both of transistors TR2 and TR3. These signals are selectively transmitted to the emitters of transistors TR2 and TR3 under the control of a control input signal applied to transistor TR1..

That is, when the control input is HIGH the level signal is applied to the base of both of transistors TR1 and TR3. Thus, transistor TR1 is turned on and transistor TR3 is turned off. As a result transistor TR2 is turned on. Since transistor TR2 is turned on and transistor TR3 is turned off, the signal applied to the base of the transistor TR2 is applied to the signal output.

If the control input is LOW, transistors TR1 and TR2 are turned off and only transistor TR3 is turned on. Thus, the signal applied to the base of the transistor TR3 is applied to the signal output.

The output of AND gate A1 is applied to the switching circuit SW1-SW5 so that the switching circuits SW1-SW5 connect to terminals b, as illustrated in figure 1, when the output of the AND gate A1 is HIGH. The switching circuits SW1-SW5 are connected to terminals c when the ouput of AND gate A1 is LOW.

Cameras 2 and 3 are installed in suitable positions so as to monitor for intruders. The lamp is located with respect to the VTR as shown in Figure 3 so that the light from the lamp is interrupted if an intruder approaches the article in custody. That is, image - record selector 8 is arranged such that lamp LP normally illuminates the base of phototransistor Q5, but

illumination of the base of phototransistor Q5 is interrupted when an intruder approaches the article in custody.

If selecting switch SW7, which regulates the recording facility, is switched to the "normal" position indicated in figure 1, lamp LP is not driven and the input to AND gate A1 becomes LOW. Thus, the output of AND gate A1 also becomes LOW. As a result, switching circuits SW1-SW5 are connected to terminals c.

Also, phototransistor Q5 is turned off when the lamp LP is not driven. Transistor Q4 is therefore turned on, transistor Q3 is turned off, and transistor Q1 is turned on. However, transistor Q2, which is connected in series with the transistor Q1 is turned off by this operation of the selecting switch SW7. Hence, record key-scan is carried out only by switch SW6.

On the other hand, if the switching circuits SW1-SW5 are connected to terminals c due to a LOW-level output from AND gate A1; the video signal provided from tunner 1 is applied to the image-record board 5 through switching circuit SW1, and the image-record board 5 applies the signal, as video signal 2, to the PiP block 4 through switching circuit SW3.

The video signal provided from tunner 1 is also applied to PiP block 4, as the video signal 1, through switching circuit SW2. The output video signal from PiP block 4 is applied to the RF converter and the line signal through switching circuits SW4 and SW5.

If the switch SW6 is ON, because selecting switch SW7 is in the "normal" position, MICOM 6 provides the record control signal to the image-record board 5. As a result, image-record board 5 records the video signal from tunner 1 through the video head.

If selecting switch SW7 is switched to the camera, so as to carry out the monitoring operation, lamp LP is driven and a HIGH level signal is applied to the input of AND gate A1. At this time, either lamp LP illuminates the base of phototransistor Q5 (normal monitoring state) or the lamp does not illuminate the base of phototransistor Q5 (intruder detected state).

If lamp LP illuminates the base of phototransistor Q5; transistor Q4 if turned OFF, transistor Q3 is turned ON, and transistor Q1 is turned OFF. That is, the record scanning pulse of MICOM 6 is applied through recording switch SW6, even if transistor Q2 is turned ON by the operation of switch SW7. Thus, the initial state is maintained, as the selecting switch SW7 is in the

"normal" position. But, if recording switch SW7 is manually turned ON, the MICOM provides a HIGH level record control signal and the output of AND gate A1 becomes HIGH. Thus, switching circuits SW1-SW5 select the b terminals. The image signals from cameras 2 and 3 are therefore applied to the PiP block 4, which provides an output through switching circuit SW4 and SW5. The PiP output signal is also recorded by the video head via switching circuit SW1 and image-record board 5.

Thus, even if lamp LP illuminates the base of phototransistor Q5, by switch SW7 being set to camera selection, the image signal from the camera is applied to the RF converter and the line signal, after being converted to a PiP signal by PiP block 4 - when recording switch SW6 is ON. Also, the image signal is applied to the image-record board 5 for recordal via the video head.

A description will now be given of the case in which the base of transistor Q5 is not illuminated, with switch SW7 set to select the camera input. Such circumstances arise when an intruder is located between lamp LP and phototransistor Q5.

If lamp LP does not illuminate the base of phototransistor Q5 , then transistor Q5 is turned off.

Transistor Q4 is turned ON. Transistor Q3 is turned OFF, and transistor Q1 is turned ON.

Transistor Q2 is turned on since the power supply Vcc is applied to the base thereof as a result of the setting of switch SW7.

That is, no signal is applied to the base of the phototransistor Q5, but transistors Q1 and Q2, which are connected in parallel with recording switch SW6, are turned on. Thus, the record scanning pulse of MICOM 6 is applied through transistors Q1 and Q2, so that MICROM 6 provides a HIGH level record control signal.

This HIGH level signal is applied to an input terminal of AND gate A1, changing the output of AND gate A1 to the HIGH level. Thus, switching circuits SW1-SW5 connect via terminals b and image signals from cameras 2 and 3 are output, as PiP signals, via PiP block 4. These PiP signals are applied to the image-record board 5 through the switching circuits SW4 and SW1 and are recorded via the video head.

Thus, if lamp LP does not illuminate the base of phototransistor Q5 (because of the presence of an intruder), transistor Q1 is turned on and MICOM 6 outputs the record control signal. The record control

signal, via AND gate A1, connects the switching circuits SW1-SW5 via the b terminals. As a result, image signals from cameras 2 and 3 are output as PiP signals, by PiP block 4, to the RF converter and the line signal.

In addition, the PiP signal is recorded via image-record board 5. The recorded PiP signal comprises the video signals from cameras 2 and 3. If an intruder does not approach the article in custody, that is, lamp LP illuminates the base of phototransistor Q5, then the recording process can be manually operated. However, if lamp LP does not illuminate the base of the phototransistor Q5 (because of the presence of an intruder), the image signals captured by cameras 2 and 3 are automatically recorded, as a PiP signal, so that pictures of the intruder are recorded.

The arrangement can be used to record the image signal only when an intruder is detected. That is, no recordal of image signals occurs in normal circumstances (the stand-by state), so that there is no waste of the tape.

As mentioned above, the present invention can be used for a monitoring operation in which images are recorded only when there is an intruder in the specified area.

The invention is not limited to the embodiment described

hereinabove. Various modifications of the disclosed embodiment as well as other embodiments of the invention will be readily apparent to persons skilled in the art upon reference to the above description of the invention. All such modifications and embodiments fall within the scope of the invention.

CLAIMS:-

1. A monitoring circuit for a VTR comprising: an image-record selector which triggers image recordal in accordance with the operation of a sensor, and a picture-in-picture unit which processes image signals from at least one video camera so as to prepare the signals for recordal.

2. A monitoring circuit as claimed in claim 1, wherein the sensor comprises a light emitting part in the form of a lamp and a light absorbing part in the form of a phototransistor Q5.

3. A monitoring circuit as claimed in claim 1 or 2, further comprising a switching control unit, a plurality of switching circuits, a video recording control unit and a MICOM, the switching control unit being connected between the image-record selector and the MICOM, the MICOM being connected to the video recording control unit and to the switching circuits and the switching circuits being connected to various inputs and outputs of the picture-in-picture unit.

4. A monitoring circuit as claimed in claim 3, wherein the switching control unit comprises a recording switch connected in parallel with two transistors, said

transistors being controlled by the image-record selector.

5. A monitoring circuit for a VTR, substantially as hereinbefore described with referene to and as illustrated in the accompanying drawings.

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